DETAILED ACTION

1. This office action is responsive to communication filed on November 6, 2009.

Response to Arguments

2. Applicant's arguments filed November 6, 2009 have been fully considered but they are not persuasive.

3. Applicant argues, with respect to claims 1 and 6, that there is no teaching in TeWinkle of reading out pixel signals from two different light receiving areas, i.e. different chips, of the image sensor bar via a same channel. Instead, in TeWinkle, the pixel signals are read out from each light receiving area via a separate channel, i.e. VO line, and the shift registers are controlled so that the pixel signals from the channels associated with the light receiving areas are read out in series to output an image signal into a common output line.

4. The Examiner respectfully disagrees. TeWinkle teaches that the subset of chips (12, figure 7) "are configured to output video data in a single serial stream" (column 4, lines 66-67). Further, TeWinkle teaches that the subset of chips "output onto a common output line" so that the subset of chips "in effect acts as one large chip with a single shift register" (column 5, lines 4-12). The Examiner interprets the "common output line" to be the claimed "same channel". As two different chips (i.e. light receiving areas) output onto a common output line, the two chips output image signals via the same channel. Claims 1 and 6, as currently written, do not require the specific configuration of Applicant's invention.

5. Applicant argues, with respect to claims 1 and 6, that there is no mention in TeWinkle of an image signal of one frame being formed from image signal which is output from the plurality of light receiving areas, including the first light receiving area and the second light receiving area.

6. The Examiner respectfully disagrees. The invention of TeWinkle is related to “scanning arrays in which a set of photosensors are arranged in a linear array, such as for scanning of hard copy images for conversion to digital data” (column 1, lines 8-13). The Examiner interprets the obtained digital image to be a claimed “image signal of one frame”. TeWinkle teaches that when an image is being scanned “video signals are output from **each chip** at a very high rate as the original hard-copy image moves past the linear array of photosensors on the chip” (column 1, lines 44-47). As video signals are output from "each chip", it is clear that the obtained frame image is formed from an image signal which is output from a plurality of light receiving areas including the first light receiving area and the second light receiving area.

7. Applicant argues, with respect to claims 1 and 6, that there is no mention anywhere in Saito et al. of the line sensor portions being part of the same image sensing element and formed on an image pickup surface of a semiconductor substrate by a plurality of divisional exposure operations, or of the outputs from the line sensor portions being read out via the same channel. Saito et al. makes no mention of forming an image signal of one frame from image signal output from the light receiving areas, i.e. line sensor portions, including the first and second light receiving areas. Instead,

the image signals from the light receiving areas, i.e. line sensor portions, in Saito et al. are only used in the focusing operation.

8. The Examiner respectfully disagrees. TeWinkle teaches the above-stated limitations allegedly not taught by Saito et al., as discussed in the body of the rejection. In response to Applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Saito is only applied to teach a correction device for correcting output pixel signals for differences in line sensor sensitivities.

9. Therefore, the rejection is maintained by the Examiner.

Claim Rejections - 35 USC § 103

10. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

11. Claims 1, 2 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over TeWinkle (US 7,164,506) in view of Saito et al. (US 7,042,491).

12. The Examiner's response to Applicant's arguments, as outlined above, is hereby incorporated into the rejections of claims 1, 2 and 5-8 by reference.

Consider claim 1, TeWinkle teaches:

An image sensing apparatus (figure 7) comprising:

an image sensing element ("image sensor array chips", 12) manufactured by a plurality of divisional exposure operations such that the image sensing element includes a first light receiving area ("I", figure 7) and a second light receiving area ("II", figure 7) which are formed on an image pickup surface of a semiconductor substrate (substrate, 14, figure 1) by the plurality of divisional exposure operations (A plurality of "sensor array chips" (12, i.e. chips manufactured by a plurality of divisional exposures) are butted end to end to form a single array of photosensors on the substrate (14), column 2, line 64 through column 3, line 4.), wherein pixel signals obtained by the first light receiving area and the second light receiving area are read out from the image sensing element via a same channel (All of the chips (I, II, etc.) are connected in serial such that they are all output onto a "common output line" such that the set of chips "in effect acts as one large chip with a single shift register", column 4, line 62 through column 5, line 12, figure 7.),

wherein an image signal of once frame is formed from image signal which is output from a plurality of light receiving areas including the first light receiving area and the second light receiving area (The invention of TeWinkle is related to "scanning arrays in which a set of photosensors are arranged in a linear array, such as for scanning of hard copy images for conversion to digital data" (column 1, lines 8-13). The Examiner interprets the obtained digital image to be a claimed "image signal of one frame". TeWinkle teaches that when an image is being scanned "video signals are output from **each chip** at a very high rate as the original hard-copy image moves past the linear array of photosensors on the chip" (column 1, lines 44-47). As video signals are output

from "each chip", it is clear that the obtained frame image is formed from an image signal which is output from a plurality of light receiving areas including the first light receiving area and the second light receiving area.)

However, TeWinkle does not explicitly teach of a correction device, or of a control device controlling said correction device.

Saito et al. similarly teaches an image sensing element (CCD module, 1, figure 1) containing a first light receiving area (line sensor, 11a) and second light receiving area (line sensor, 11b), column 4, lines 6-16. However, in addition to the teachings of TeWinkle, Saito et al. teaches that the difference in sensitivity between respective line sensor arrays can cause adverse effects in the output images (column 1, line 56 through column 2, line 30).

Therefore, Saito et al. teaches:

a correction device (ADC portion, 22) which corrects a pixel signal output from said image sensing element (The A/D conversion is adjusted to correct for differences in the sensitivities of the line sensors (11a and 11b), column 9, lines 1-13. This process is detailed further in figure 5 and column 8, line 4 through column 9, line 13.); and

a control device (DAC portion, 23) which controls said correction device (22) to multiply a correction value to pixel signals read out from the first light receiving area (11a) and the second light receiving area (11b) via the same channel (“A”) and to write the pixel signals to which the correction value is multiplied to a memory (RAM 24a, 24b, column 7, lines 24-30) as pixel data of a captured image (The A/D conversion range used the for individual sensors is set based upon the sensitivities of the individual

sensors, and this A/D conversion range is adjusted based upon the output of the DAC (23), column 6, lines 13-29, column 8, lines 14-24 and lines 63-67, column 9, lines 1-13.), wherein

said correction device (22) corrects the pixel signal output from said image sensing element so that a difference between the pixel signals read out from the first light receiving area and the second light receiving area is canceled (The sensitivity difference is corrected, column 9, lines 1-13.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to include a correction device taught by Saito et al. in the image sensing apparatus taught by TeWinkle for the benefit of preventing adverse effects in the output images of respective sensor arrays due to the difference in sensitivity between the respective sensor arrays (Saito et al., column 1, line 56 through column 2, line 30).

Consider claim 2, and as applied to claim 1, TeWinkle additionally teaches that color filters of a plurality of colors are formed on the first and second light receiving areas (A “full-color version” typically has three parallel linear arrays of photosensors (i.e. three blocks), each array being sensitive, such as by the inclusion of a color filter layer, to one primary color, column 3, lines 34-42.). As Saito et al. teaches that individual linear arrays differ in sensitivity (see claim 1 rationale), and TeWinkle teaches that individual linear arrays (i.e. individual blocks) each contain color filters sensitive to one

primaray color (column 3, lines 34-42), the combination of TeWinkle and Saito et al. teaches using a different correction value for each color (i.e. for each block).

Consider claim 5, and as applied to claim 1 above, TeWinkle additionally teaches that color filters of a plurality of colors are formed on the first and second light receiving areas (A “full-color version” typically has three parallel linear arrays of photosensors, each array being sensitive, such as by the inclusion of a color filter layer, to one primary color, column 3, lines 34-42.). As Saito et al. teaches that individual linear arrays differ in sensitivity (see claim 1 rationale), and TeWinkle teaches that individual linear arrays each contain color filters sensitive to one primaray color (column 3, lines 34-42), the combination of TeWinkle and Saito et al. teaches using a different correction value for each color.

Claim 6 recites an image sensing apparatus similar to the image sensing apparatus recited in claim 1, and matching features are rejected using the same rationale (see claim 1 above).

TeWinkle additionally teaches that color filters of a plurality of colors are formed on the first and second light receiving areas (A “full-color version” typically has three parallel linear arrays of photosensors, each array being sensitive, such as by the inclusion of a color filter layer, to one primary color, column 3, lines 34-42.). As Saito et al. teaches that individual linear arrays differ in sensitivity (see claim 1 rationale), and TeWinkle teaches that individual linear arrays each contain color filters sensitive to one

primaray color (column 3, lines 34-42), the combination of TeWinkle and Saito et al. teaches using a different correction value for each color.

Consider claim 7, and as applied to claim 6 above, TeWinkle additionally teaches that the image sensing element outputs a signal from a different output unit for each light receiving area (A different output (SROUT) is provided for each light receiving area (I, II, etc.) of the image sensing element, figure 7, column 5, lines 4-12.). TeWinkle does not explicitly teach performing correction. Saito et al. teaches that a different correction value is used for each linear array and thus each output unit (see claims 1 and 6 rationale).

Consider claim 8, and as applied to claim 6 above, TeWinkle does not explicitly teach performing correction.

Saito et al. further teaches that correction is performed using a different correction value for each lens (As a lens directs light to the line sensors (column 8, lines 37-38), and different correction values are used for each line sensor (see claims 6 and 1 rationale), a different correction value is used for each lens.).

13. Claims 3, 4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over TeWinkle in view of Saito et al. as applied to claims 1 and 6 above, and further in view of Okisu et al. (US 6,571,022).

Consider claim 3, and as applied to claim 1 above, TeWinkle further teaches that the light receiving areas include at least three partial image sensing regions in one direction (see I, II, etc., figure 7). Saito et al. teaches that different correction values are used for individual linear arrays (see claim 1 rationale). However, the combination of TeWinkle and Saito et al. does not explicitly teach that said correction device corrects at least two of the three partial image sensing regions with correction values by using as a reference a central partial image sensing region selected from the three partial image sensing regions.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12) and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27. Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture left and right partial images.), and a correction device which corrects a pixel signal output from said image sensing element (See figures 8 and 9. The image sensing element (12, 13) outputs signals to an image processor (19). The image processor (see figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-67. The shading corrector (194) corrects output levels of pixels of the image sensing element (12, 13), column 8, lines 19-22.).

However, Okisu et al. further teaches:

The light receiving areas (12, 13) include at least three partial image sensing regions in one direction, and said correction device corrects at least two of the three partial image sensing regions with correction values by using as a reference a central

partial image sensing region selected from the three partial image sensing regions (Okisu et al. teaches that three or more image pickup regions (i.e. light receiving areas) can be used, column 23, line 64 through column 24, line 2. Okisu et al. further teaches normalizing the pixel values to the center of a light receiving surface (i.e. a central partial image sensing region), column 9, lines 50-55.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to use the central image sensing region taught by the combination of TeWinkle and Saito et al. as a reference as taught by Okisu et al. to obtain predictable results while applying a known technique to a known device.

Consider claim 4, and as applied to claim 1 above, the combination of TeWinkle and Saito et al. does not explicitly teach performing correction using different correction values in a boundary direction between the light receiving areas.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12) and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27. Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture left and right partial images.), and a correction device which corrects a pixel signal output from said image sensing element (See figures 8 and 9. The image sensing element (12, 13) outputs signals to an image processor (19). The image processor (see figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-

67. The shading corrector (194) corrects output levels of pixels of the image sensing element (12, 13), column 8, lines 19-22.).

Okisu et al. further teaches that said correction device performs correction using different correction values in a boundary direction between light receiving areas (Because different correction values are used for each pixel (column 9, lines 55-58) of each light receiving area (column 10, lines 24-27), and a boundary can be randomly produced using a variety of shapes (see figure 26A and 26B, column 15, line 51 through column 16, line 3), different correction values are used based on which pixels of the various light receiving regions comprise the boundary.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the correction device taught by the combination of TeWinkle and Saito et al. use different correction values in the boundary direction as taught by Okisu et al. to obtain predictable results while applying a known technique to a known device.

Consider claim 9, and as applied to claim 6 above, the combination of TeWinkle and Saito et al. does not explicitly teach that correction is performed using a different correction value for each exit pupil position of an optical system.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12) and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27. Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture

left and right partial images.), and a correction device which corrects a pixel signal output from said image sensing element (See figures 8 and 9. The image sensing element (12, 13) outputs signals to an image processor (19). The image processor (see figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-67. The shading corrector (194) corrects output levels of pixels of the image sensing element (12, 13), column 8, lines 19-22.).

Okisu et al. further teaches that correction is performed using a different correction value for each exit pupil position of an optical system (Different correction values are used for each pixel, column 9, lines 55-58. Each pixel has a separate lens which has a different optical characteristic, which different optical characteristic would cause different exit pupil positions. See figures 11-13, column 8, lines 47-58.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the correction device taught by the combination of TeWinkle and Saito et al. use different correction values for different exit pupil positions as taught by Okisu et al. to obtain predictable results while applying a known technique to a known device.

Consider claim 10, and as applied to claim 6 above, the combination of TeWinkle and Saito et al. does not explicitly teach that correction is performed using a different correction value for each F-number.

Okisu et al. similarly teaches an image sensing apparatus (camera, figures 2 and 8) comprising an image sensing element having a first light receiving area (CCD, 12)

and a second light receiving area (CCD, 13, See figures 2 and 8, column 6, lines 16-27. Two color image pickup devices (12 and 13) are situated behind the lens (2) to capture left and right partial images.), and a correction device which corrects a pixel signal output from said image sensing element (See figures 8 and 9. The image sensing element (12, 13) outputs signals to an image processor (19). The image processor (see figure 9) contains a shading corrector (194, i.e. a correction device), column 7, lines 61-67. The shading corrector (194) corrects output levels of pixels of the image sensing element (12, 13), column 8, lines 19-22.).

Okisu et al. further teaches that correction is performed using a different correction value for each F-number (Different correction values are used for each pixel, column 9, lines 55-58. Each pixel has a separate lens which has a different optical characteristic, which different optical characteristic would cause each lens to have a different F-number. See figures 11-13, column 8, lines 47-58.).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of the invention to have the correction device taught by the combination of TeWinkle and Saito et al. use different correction values for F-numbers as taught by Okisu et al. to obtain predictable results while applying a known technique to a known device.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALBERT H. CUTLER whose telephone number is (571)270-1460. The examiner can normally be reached on Mon-Thu (9:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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